REPORTING INFORMATION

[0001] This disclosure relates to reporting in a wireless communication system and more particularly to reporting of information in relation to a wireless device provided with coexisting radios.

[0002] A communication system provides a facility that enables communication sessions between two or more entities such as fixed or mobile communication devices, base stations, servers, machine type devices, and/or other communication nodes. A communication system and compatible communicating entities typically operate in accordance with a given standard and/or specification setting out how the various entities shall operate. In a wireless communication system at least a part of the communication between at least two devices, or stations occurs over a wireless interface. Examples of wireless systems include public land mobile networks (PLMN) such as cellular networks, satellite based communication systems and different wireless local networks, for example wireless local area networks (WLAN). A wireless connection can also be provided by short range radio, for example based on the Bluetooth™ radio.

[0003] An example of wireless communication systems is an architecture that is being standardized by the 3rd Generation Partnership Project (3GPP). This system is often referred to as the long-term evolution (LTE) of the Universal Mobile Telecommunications System (UMTS) radio-access technology. A further development of the LTE is often referred to as LTE-Advanced. The various development stages of the 3GPP LTE specifications are referred to as releases.

[0004] Communications can be provided between appropriate communication devices. In a wireless system a communication device can provide a transceiver station that can communicate with another communication device such as e.g. base stations of access networks and/or other user equipment. A communication device of a user is often referred to as user equipment (UE) or terminal. A communication device is provided with an appropriate signal receiving and transmitting arrangement for enabling communication of data and signalling with other parties. For example, access to a communication network or communications directly with other users can be provided. The communication device may access a carrier provided by a station, for example a base station providing art least one cell, and transmit and/or receive communications on the carrier. Carrier aggregation can be used to increase performance. In carrier aggregation a plurality of carriers are aggregated to increase bandwidth. Carrier aggregation comprises aggregating a plurality of component carriers into a carrier that is referred to in this specification as an aggregated carrier. For example, LTE-Advanced is capable of providing carrier aggregation. In LTE-A two or more component carriers (CCs) can be aggregated in order to support wider transmission bandwidths and/or for spectrum aggregation. Depending on its capabilities, it is possible to configure a user equipment (UE) to aggregate a different number of component carriers, either originating from the same location or from different ones, and/or either from the same frequency band or different ones. A primary component carrier can be provided by a primary cell (PCell) whereas further carriers can be provided by at least one secondary cell (SCell). SCells form together with the PCell a set of serving cells. To enable reasonable battery consumption by the user equipment when aggregating carriers, an activation/deactivation mechanism of SCells is supported. When an SCell is deactivated, it is not necessary for the user equipment to receive the corresponding physical downlink control channel (PDCCH) or physical downlink shared channel (PDSCH). Also, in this state the user equipment cannot transmit in the corresponding uplink and nor is it required for it to perform channel quality indicator (CQI) measurements. Conversely, when an SCell is active, the user equipment shall receive PDSCH and PDCCH (if the user equipment is configured to monitor PDCCH from this SCell), and is expected to be able to perform CQI measurements.

[0005] A communication device can be provided with a multiple of coexisting radios in order to allow users to access various networks and services ubiquitously. For example, a wireless communication device can be equipped with multiple radio transceivers. The number of such devices is increasing. In accordance with a more particular example a mobile device may be equipped with a cellular radio (e.g. LTE), a wireless local area network (e.g. WiFi™), and a short range radio (e.g. Bluetooth™) transceivers, and global navigation satellite system (GNSS) receivers. This can cause problems in view of interference, and more particularly, coexistence interference between the collocated radio transceivers. In-device coexistence (IDC) interference can occur for example when transmitting in one frequency band interferes with receiving in another band within the same equipment. For example, due to the proximity of multiple radio transceivers, the transmit power of one transmitter may be much higher than the received power level of another receiver. By means of filter technologies and sufficient frequency separation, the transmit signal may not result in significant interference. But for some coexistence scenarios, e.g. different radio technologies within the same device operating on adjacent frequencies, current state-of-the-art filter technology might not provide sufficient rejection. Therefore, solving the interference problem by a single generic radio frequency (RF) design may not always be possible and alternative methods may need to be considered.

[0006] A base station serving a mobile device can be used to mitigate the effect of coexistence interference. One of the proposals for avoidance of in-device coexistence interference in relation to the LTE is for the user equipment to signal information to the radio access network based on which a controller associated with the base station can made decision such as when transmission/reception or other radio signal would benefit or no longer benefit from not using certain carriers or frequency resources. A more particular example is known as a Frequency Domain Multiplexing (FDM) Solution. In accordance with this solution an Industrial, Scientific and Medical (ISM) radio signal is led away from LTE frequency band in frequency domain. The arrangement may also need to avoid coexistence interference to ISM radio during an initial stage to help the ISM radio to complete the necessary procedure to enable this option. Another example for avoidance of in-device coexistence interference is known as a time domain multiplexing (TDM) solution. In the TDM scheduled and unscheduled periods are alternated on the problematic frequencies to ensure that transmission of a signal does not coincide with reception of another signal. To provide control based on e.g. FDM and/or TDM principles, the access system relies on information signalled from the user equipment to the network element, which in LTE would be evolved NodeB (eNB). Based on such information, final TDM patterns (i.e. scheduled and